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THE BABYLONIAN CALENDAR

The astrology of the Chaldeans was proverbial among the Hebrews and in the classical world. That Hipparchus was acquainted with, and made use of, the results of the investigations of the Babylonian astronomers was known from the *Almagest* of Ptolemy, but we had no idea of the accuracy of the Babylonians' knowledge of the movements of the sun, moon, and stars until the patient labors of Strassmaier, Epping, Kugler, and others unriddled the enigmas of the astronomical tablets which have come down to us. Quite an extensive literature on the subject has sprung up, but for those who have had no special training in astronomy this literature is often more obscure than the original texts. However, one is usually able to follow the author when he comes to the summary. It is the purpose of this review to give the gist of the *résumé et conclusions* of a recent study of one phase of Babylonian astronomy.¹

Documents going as far back as *ca.* 2800 B.C. show that already in this early period the Babylonian year was a lunisolar year and that the inhabitants of the Euphrates Valley had hit upon the principle of inserting an intercalary month from time to time to restore the coincidence between the lunar and solar years. Up to the twenty-second century B.C. the intercalary month was always a second Adar (twelfth month); about 2100 B.C. Hammurabi introduced a second Ulul (sixth month). The Babylonian month had twenty-nine or thirty days. There was no regular alternation of these months. The official commencement of the month always coincided with the first appearance of the new moon. This phenomenon was regularly observed by the Babylonian astronomers, and by the second century B.C. they were able to compute in advance the time of the new moon. Before the eighth century B.C. the intercalation of a thirteenth month did not follow any recognized astronomical principle, but beginning with the era of Nabonassar (February 26, 747 B.C.) the year was so arranged that the first of Nisan always followed the equinox (vernal). By the sixth century we find the cycle of nineteen years of 235 months. Of these, twelve were common years and seven embolismic years. The nineteen-year cycle was perfected little by little, and beginning with 367 B.C. the order of the embolismic years in the cycle was definitely fixed. The years 3, 6, 8, 11, 14, and 19 had a second Adar, the year 17 a second Ulul. The length of the Babylonian year varied within very narrow limits. The common year had 353, 354,

¹ *Étude sur la chronologie assyro-babylonienne.* (Extrait des mémoires présentés par divers savants à l'Académie des Inscriptions et Belles-Lettres, tome XIII.) By M. D. Sidersky. Paris: Imprimerie nationale, 1916. 94 pages. Fr. 4.

or 355 days; the embolismic year, 383, 384, or 385 days—that is, thirty days more than the common year. These are exactly the limits of the year in the Jewish calendar which has been in use from 359 A.D. to the present day. The peoples of the ancient Orient modeled their calendars upon that of the Babylonians—this is seen particularly in the calendars of the Greeks, Syrians, and Jews.

The writer gives an occasional footnote to the refutation of the claims of the pan-Babylonists, who try to prove that the earliest Babylonians of whom we have any record were already in possession of an exact astronomical science. As we have seen, the Babylonians' astronomical science was the result of a slow evolution within historical times; the culmination comes in the latest days of their history.

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STUDIES IN MEDIAEVAL CHURCH HISTORY

In a recent treatise by Fournier¹ the comparative method is applied for the first time to several collections of canons compiled in Italy between the years 900 and about 1020. They are of importance as showing legal ideals and enactments in some parts of Italy in periods of decadence such as the Pornocracy prior to the Hildebrandine Reform.

A Neapolitan or Beneventan canonist of the early tenth century made a collection which incorporates among other material the longest text of the *Collectio Hibernensis* (Vallicellana, tome XVIII). This was soon revised and augmented in the same general locality by one who put together a *Collection in Nine Books* (Codex Vaticanus 1349). Between 1014 and 1023 a canonist who probably lived in the region between Naples and Umbria put forth the *Collection in Five Books*. It was based chiefly on the *Collection in Nine Books*, but also on many other laws and on fragments of penitentials, often apocryphal. It does not, however, reflect to any considerable degree the Pseudo-Isidorian Decretals. The *Collection in Five Books* was widely used, as its immediate predecessors, now preserved in unique manuscripts, had probably not been. Like his famous contemporary, Burchard of Worms, its compiler was in sympathy with the early stage of the reform movement as it existed under the emperor Henry II. Like Burchard, he also stressed the systematic

¹ *Un Groupe de recueils canoniques italiens des X^e et XI^e siècles.* (Extrait des Mémoires de l'Académie des Inscriptions et Belles-Lettres, tome XI.) Par Paul Fournier. Paris: Imprimerie nationale, 1915. 123 pages.